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9 August 1965

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## INTELLIGENCE MEMORANDUM

CURRENT AND FUTURE  
SOVIET MISSILE-SUBMARINE PROGRAMS AND MISSIONS

DIRECTORATE OF INTELLIGENCE

Office of Research and Reports

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FOREWORD

This memorandum reviews the construction programs for Soviet missile submarines and their evolution from 1955 to the present. Although the programs for both cruise-missile and ballistic-missile submarines are discussed, the principal focus is on the development of the ballistic-missile submarine force, changes in the Soviet view of the strike role of this force, and a discussion of evidence concerning its mission and growth in the future.

The intelligence information which forms the basis of this review varies in quality and quantity.

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Overhead photography now provides the principal information on the existence of new naval units, but usually only after these ships have been launched or delivered.

A reexamination of the public statements by responsible Soviet officials over the past decade in the light of the evidence that is now available on the timing of Soviet naval construction programs shows that these statements have had some predictive value with respect to future programs. The insights derived from this reexamination constitute an important input in this memorandum, in that they aid in assessing the current goals of Soviet naval policy and provide a basis on which the probable pace and direction of naval construction programs over the next few years are projected.

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CURRENT AND FUTURE  
SOVIET MISSILE-SUBMARINE PROGRAMS AND MISSIONS\*

Summary and Conclusions

The Soviet Navy has had the responsibility since 1955 for conducting strategic strikes against land targets in enemy territory, although the scope of this mission has varied considerably. Initially, the mission was defined to include strikes against economic, administrative, and military targets in both coastal areas and inland. The initial mission concept was narrowed in 1959 to targets in coastal areas, primarily naval bases, ports, and support facilities. In early 1963, Soviet statements indicate that the mission may have been expanded again to its original scope through the reassignment to the Navy of targets deep in enemy territory. There is some uncertainty, however, about the views of the new Soviet political and military leadership on this expansion since the fall of Khrushchev in late 1964, and there may even be continuing controversy on this subject which has not yet been resolved within the Soviet hierarchy.

In general, Soviet construction programs for missile-launching submarines have paralleled the modifications in the naval mission. With the assignment of a strategic mission to the Navy in 1955, new programs were initiated for both diesel and nuclear-powered ballistic-missile submarines -- the G and H classes (SSB and SSBN) -- as well as for a new cruise-missile submarine, the nuclear-powered E class (SSGN).\*\* The change in emphasis that began in about 1959 was manifested by a considerable expansion in the construction of cruise-missile submarines capable of combating US carrier strike forces and attacking land targets of naval interest, while the ballistic-missile submarine programs were apparently curtailed. As a result, the last G- and H-class units were completed in 1962 and 1963, respectively, and the entire output of Soviet missile-launching submarines since that time has consisted of the nuclear-powered

\* The estimates and conclusions in this memorandum represent the best judgment of this Office as of 15 July 1965. For tables on production and deployment of submarines, see the Appendix.

\*\* The G class is diesel/battery powered and is configured to carry three missiles. The H class is nuclear powered and also is configured to carry three missiles. The E class consists of two models: the E-I, which is configured to carry six cruise missiles, and the E-II, which carries eight cruise missiles.

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E, and later the diesel-powered J class (SSG), \* cruise-missile submarines.

Although there was some evidence in mid-1964 that units of a new class of large ballistic-missile submarines had been completed, the indications of such a program have remained unsubstantiated and are now considered invalid. The evidence consisted of four different observations of submarines which, by virtue of their apparent length and other features, appeared to be candidates for the first units of such a new class. However, continued analysis of these observations -- most of which were made in poor-quality photography -- and the failure of subsequent high-quality coverage of shipyards and operating bases to reveal any unusual submarines lead to the conclusion that these were not units of a new class. This memorandum presents the alternative explanations of these observations that have resulted from reexamination of the evidence.

The principal uncertainty with respect to future Soviet missile-submarine programs concerns the timing of a new naval ballistic-missile program and the likely duration of the current cruise-missile programs. If it is assumed that a decision was made in 1963 to go ahead with the development and the start of production of a new ballistic-missile submarine system and that this program continues to have the support of the new Soviet leadership, the first unit of a new class could be operational by late 1967 or early 1968. In this case the lead unit might be launched and potentially detectable in photography some time in the next 12 to 18 months. On the other hand, in view of the uncertainty about governmental support for the expanded role of ballistic-missile submarines, it is possible that no new construction program is yet under way. Even so, it seems likely that Soviet recognition of the high military potential of nuclear-powered submarines operating in a retaliatory strike role and the capability implied by the recent appearance of new Soviet solid-fueled missiles will lead eventually to the development of a solid, submarine-launched ballistic-missile system. New units of such a system could be operational by the early 1970's if the program is initiated in the next year or two.

In any event, it appears doubtful that any major change in the force structure of ballistic-missile submarines will occur before 1968. It is likely, however, that all of the existing H-class submarines will be modified to accommodate the liquid-fueled 650-nautical-mile (nm) missile

\* The J class is configured to carry four cruise missiles.

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system (designated SS-N-5)\* during the next few years. There is no indication as yet that the G-class submarines will be similarly modified.

Of the five shipyards engaged in the construction of submarines since 1961, three are currently producing cruise-missile submarines, one is producing torpedo-attack submarines, and one is producing both. With the exception of the E-II-class program at Komsomol'sk, which may terminate this year, it is estimated that all of the current cruise-missile submarine programs (the E-II-class program at the Severodvinsk Shipyard and the J-class programs at the Baltic Shipyard in Leningrad and the Krasnoye Sormovo Shipyard in Gor'kiy) will continue through 1967. At Komsomol'sk, production may be changed from the E to another type, such as the N (SSN) or a successor, in order to bolster nuclear-powered torpedo-attack submarine capability in the Pacific.

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\* The SS-N-5 is designed to be launched from a wholly submerged submarine.

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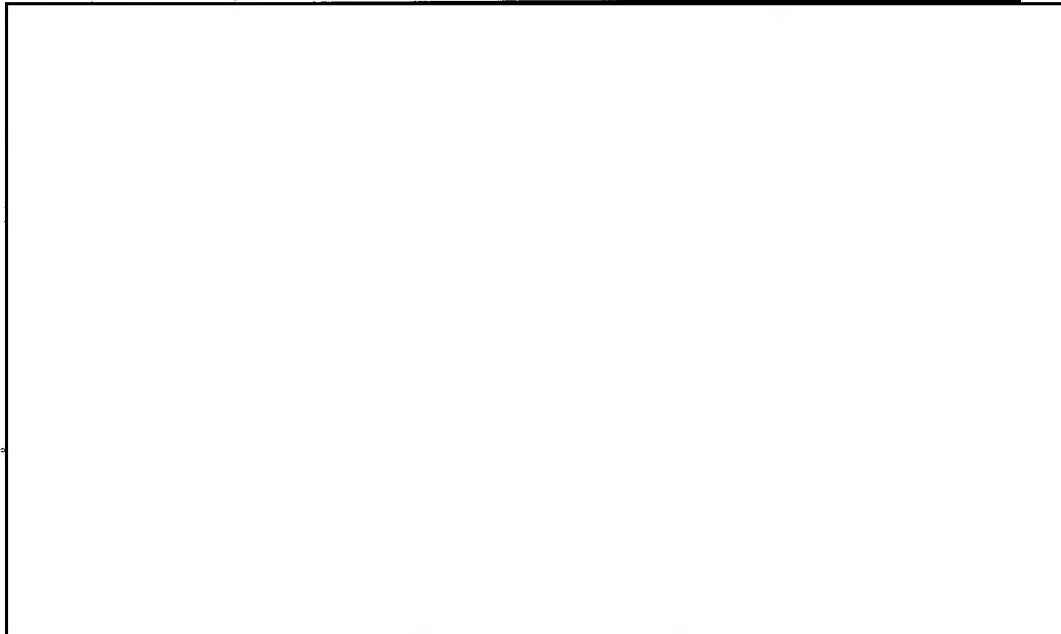
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I. Missile-Submarine Construction Programs

The number of Soviet shipyards and the extent of facilities engaged in submarine construction have varied considerably during the past 10 years, reflecting changing emphasis and trends. From 1957 -- when the program for the construction of the W-class (SS) diesel torpedo-attack submarine finally terminated -- until 1961, only three shipyards were engaged in the construction of submarines. Two of these were building ballistic-missile submarines. In 1961, two more shipyards were added. Currently, three of these five are engaged in the production of cruise-missile submarines, one is constructing torpedo-attack submarines, and one is building both. The location of shipyards in the USSR that are engaged in the construction of submarines is shown on the map, Figure 1.

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It is unlikely that any of these shipyards have launched or completed a new class of ballistic-missile submarine since the termination of the construction programs for the G and H classes of ballistic-missile submarines.

The order of battle and deployment of missile submarines for mid-1965 are shown on the map, Figure 2.

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A. Ballistic-Missile Submarine Programs

In 1955, construction of G-class and H-class submarines was started at the Severodvinsk Shipyard near Arkhangel'sk and G-class submarines at the Komsomol'sk Shipyard in the Far East. These two classes are the only ones known to have been constructed specifically for the launching of ballistic missiles. Seven Z-V-class (SSB) diesel-powered ballistic-missile submarines were produced during 1956-58, but these were modified Z-class (SS) torpedo-attack types (see the photographs).

The last G- and H-class submarines were completed in 1962 and 1963, respectively. Working back from the evidence of shipyard activity and the time required to construct these submarines, it can be concluded that a decision to bring these programs to a termination was probably made in about mid-1959. This decision apparently permitted completion of all G- and H-class units that had already been scheduled but did not allow new starts to be made. (In this respect it was similar to the 1955 decision to stop the W-class submarine program, the last units of which were not completed until 1957.) Accordingly, it was several years after the decision before the last G class was completed in 1962 and the last H class in 1963. It is possible that the H-class unit completed in 1963 was modified during the construction period to fire the SS-N-5 missile.\*

The 1959 decision apparently was the consequence of a larger decision which gave primary responsibility for strikes against strategic targets to the newly formed Strategic Rocket Forces and relieved the ballistic-missile submarine forces of the responsibility for attacking deep enemy objectives. Many factors were influential in this decision (see II, B, below), among them the relatively short range and low effectiveness of the Soviet submarine-launched ballistic-missile systems, compared with the US Polaris system or with the Soviet ICBM systems then being developed and the existing MRBM and IRBM systems. Other important factors were the relatively small number of missiles carried by each submarine, (three) and the apparent lack of readiness to carry out long-range patrols.

\* Units of the H class that were produced earlier were originally equipped to fire the SS-N-4 liquid-fueled 350-nm-range ballistic missile. All G-class submarines, with the exception of one testbed for the SS-N-5 missile, are believed to be equipped to fire only the SS-N-4.

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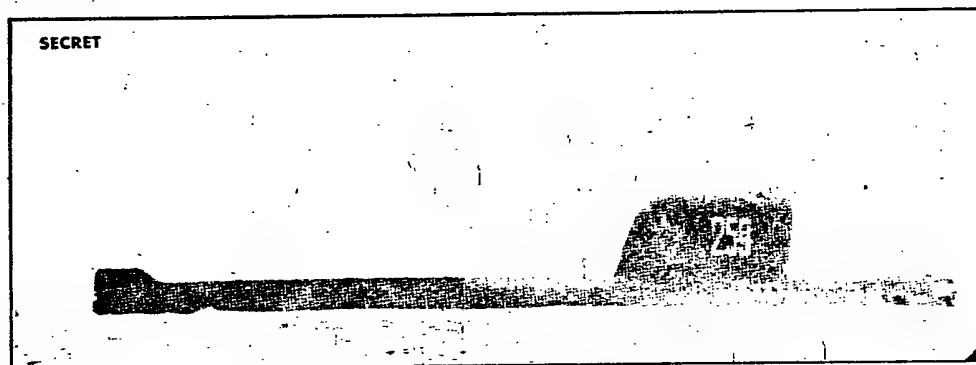
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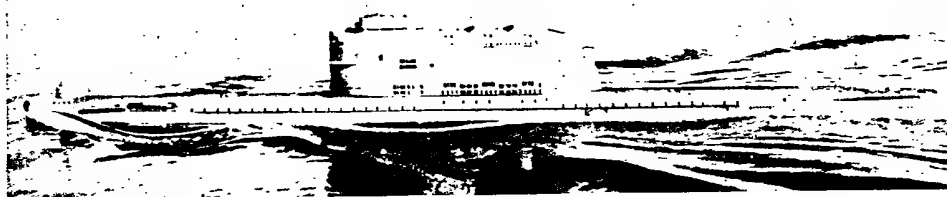
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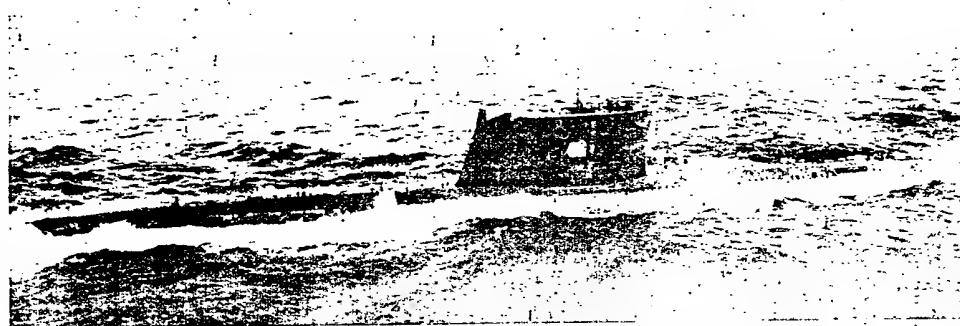
# USSR: BALLISTIC-MISSILE SUBMARINES



H-Class Nuclear Ballistic-Missile Submarine (SSBN)



G-Class Ballistic-Missile Submarine (SSB)



ZV-Class Ballistic-Missile Submarine (SSB)

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A considerable change in Soviet operational capabilities has been reflected by a sharp increase in out-of-area operations since 1963, when Admiral of the Fleet S. G. Gorshkov, Commander-in-Chief of the Soviet Navy and Deputy Minister of Defense, admonished naval units to conduct more frequent and realistic operations on the high seas. The drive since 1963 to improve out-of-area capabilities is significant because it appears to coincide with official statements regarding an expanded role for the Navy (see II, C, below). Whereas there was little evidence before 1964 that the Soviet Navy could maintain an operational force some distance from local naval theaters for any length of time, a small force of diesel-powered submarines and surface ships has been in almost continuous operation in the Mediterranean since mid-1964. In addition, out-of-area operations were a particularly critical factor with respect to nuclear-powered submarines. Not until early 1965 were there any known out-of-area operations of nuclear-powered submarines in which the submarine was not accompanied by -- or at least had in the vicinity of operation -- a naval auxiliary unit for escort or support. More important, however, would seem to be the periodic patrols of 5 to 6 weeks' duration carried out during the past year by both ballistic-missile and cruise-missile submarines, as far from Soviet shores as a few hundred miles south of the Aleutians in the central North Pacific and also as far south as the Azores in the central North Atlantic.

B. Reanalysis of Certain Observations in the Northern Fleet Area in 1964

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Although initial analysis of four observations in the Northern Fleet area between [ ] seemed then to indicate that a new class of large ballistic-missile submarine may have been under construction, these indications have not been substantiated and are not believed to be valid evidence of a new program. Because of the obvious importance of determining whether new units are currently being constructed, the evidence is reviewed below in some detail, together with the reasons for concluding that it is not indicative of a new program.

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The first observation was of a long object at the Severodvinsk Naval Base on Yagry Island in [ ]

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[ ] This naval base lies across the Nikolskoye Estuary from the Severodvinsk Shipyard. The imagery was fuzzy and no firm conclusions could be drawn about its length and characteristics, but this object was believed to be a submarine, and estimates of its length ranged from 408 to 425 feet. The base at Yagry Island, where this submarine was seen, probably is a nuclear submarine support facility. All submarines that

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have been positively identified at the base have been nuclear powered. Some analysts believed that there was a long sail visible about amidships. On photographic material of excellent clarity obtained from recent missions covering this facility, a nuclear-powered submarine with a temporary shed erected over a portion of the hull immediately abaft the sail was observed. In poor-quality photography the combination sail and shed could give the impression of a long sail. Although no fully satisfactory explanation of this observation is possible, there are good grounds for believing that the apparent long sail may have been a combination of sail and shed.

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The second observation was the sighting by a collateral source of a submarine, estimated to be over 400 feet long, northeast of Mys Teriberskiy on the Murman Coast on 15 July 1964. This submarine was reported to have a long high sail located about amidships, the length of which was said to be about half the length of the submarine. There was a raised housing atop the sail near the forward end. It has been suggested that this might be one of a new class, possibly nuclear-propelled ballistic missile submarine and that it could be the same submarine sighted earlier in [redacted] at the Severodvinsk Naval Base on Yagny Island.

There are a number of arguments against the view that this was either nuclear powered or one of a new class of ballistic-missile submarine. This submarine probably is diesel powered. In all observed Soviet nuclear-powered submarines, including the N class, the distance aft of the sail to the stern has not been less than about 200 feet. The reported length of the sail and its position amidships in this submarine would indicate a stern length of more than 100 feet but far short of the usual 200 feet, probably closer to the length of the stern portion of the G class. It is possible that the USSR could have developed a large hull diameter to house the reactor and machinery in a much shorter space, but there is no evidence of this development.

Some of the characteristics of this submarine raise doubts about its purpose. The raised housing atop the sail is reminiscent of the sail configuration of the G class, a design feature that would not be expected in an improved model. A long high sail to house additional missiles would be a requirement for the SS-N-4 missile system because the missile and its elevating mechanism would require a long tube and high sail. It would hardly be a feature of a new model designed to accommodate the SS-N-5 missile, which can be fired from its stowed position in the tube and therefore would not require a sail of such height. If the sail height

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is similar to that of the G class, then this submarine most likely was designed originally to accommodate the SS-N-4.

This submarine probably was completed some time before 1963. It now seems most likely that it is an experimental or one-of-a-kind unit to test the feasibility for carrying more than the usual load of three SS-N-4's. It also is possible that the submarine is shorter than estimated, for there have been no other reports of such a long submarine. It is doubtful that this unit is the same as the probable nuclear-powered submarine observed in June at Yagry Island. Neither of these units is believed to represent a follow-on ballistic-missile program.

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The third observation was the sighting in [REDACTED] of a long submarine in the launching basin in the Severodvinsk Shipyard. The imagery in this photography was fuzzy, and estimates of the length varied from 420 [REDACTED] feet. Although no sail configuration was visible, it was believed that the submarine was a cruise-missile type. It was not possible to establish the identity of this submarine from [REDACTED] but it is now believed to have been an E-II-class nuclear-powered cruise-missile submarine. The Severodvinsk Shipyard is known to have been constructing E-II-class submarines at that time.

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Furthermore, whereas estimates of the length of the E-II class previously averaged about 375 feet, the actual length now has been established at about 400 feet from recent photography. Subsequent photography of the shipyard revealed E-II-class submarines at the fitting-out quay but did not show any ballistic-missile submarine larger than the H class. The difference in length between the E-II and that calculated for the submarine seen in [REDACTED] is believed to be attributable to the poor quality of the photography from that mission and to the fact that it is inherently difficult in such photography to fix firmly the end points of the submarine or to establish accurate scale factors.

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The fourth observation, in [REDACTED] was of a long submarine in a floating dock within the launching basin at Severodvinsk. Original estimates of its length varied from 390 to 410 feet, but more recent analysis shows that it is nearer 390 feet. The visible sail is believed to be similar to that on the H-class nuclear-powered ballistic-missile submarine. Current evaluation of this submarine, therefore, is that it is a unit of the H class. The appearance of a submarine of this class in a floating dock in the launching basin suggests that the submarine had been damaged or was to undergo

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some specialized type of hull work. Because the last H-class unit constructed was probably completed in [REDACTED] this unit is not believed to be new construction.

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[REDACTED] of the Severodvinsk area and the Northern Fleet operating bases has varied in quality from poor to excellent. The submarines that were estimated to exceed 400 feet in length were observed only in poor-quality photography where identification as to type was not possible and measurements of length were extremely tenuous. In every case of good photography where identification of type or class was possible and where measurements of length could be made with great confidence, no submarine exceeding 400 feet in length and no new class of ballistic-missile submarine have been observed.

In summary, there appears to be no reliable evidence on which to base a conclusion that any units of a new class of nuclear-powered ballistic-missile submarine have been launched or completed since the termination of the G- and H-class programs. It is possible that a single diesel-powered unit with an enlarged sail is in the Northern Fleet, but it is believed that this unit probably is experimental. There is no evidence of the construction of additional units of this class.

#### C. Cruise-Missile Submarine Programs\*

The primary role of the Soviet cruise-missile force is to combat US seaborne forces, particularly carrier strike forces. Cruise-missile submarines would probably also be employed in strikes at coastal targets of naval interest such as naval bases, ports, and support facilities and could be used to attack other coastal targets as well. The importance which the Soviet authorities have attached to this mission in recent years is reflected in the missile-launching submarine construction programs. As a result of increasing concentration on this type of submarine, four of the five Soviet shipyards now engaged in submarine production are constructing cruise-missile submarines. Perhaps even more indicative is the simultaneous construction at two of these shipyards of the E class -- the first class of nuclear-powered submarine to be constructed in more than one shipyard at the same time.

\* There are two models of submarine-launched cruise missiles: (1) the SS-N-3A, 300-nm range, low flight profile (under 3,000 feet), and (2) the SS-N-3B, 450-nm range, designed to fly at about 40,000 feet. All cruise-missile submarines are believed capable of firing the SS-N-3A, but only the E-II and J classes are believed capable of firing the SS-N-3B.

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The decision to bring to a termination the H-class program at Severodvinsk apparently was supplemented at the same time with the decision to start construction of the E-II class (Project No. 675) at both Severodvinsk and Komsomol'sk.

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The first E-II unit probably was completed at Severodvinsk in 1962, the same year that the first unit was completed at Komsomol'sk.



USSR: E-II-CLASS NUCLEAR GUIDED-MISSILE SUBMARINE (SSGN)

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25X1D Seven E-II class (shipyard hull Nos. 1771-1777) have been scheduled for construction at Komsomol'sk. Five of these have been completed, and it is estimated that the remaining two hulls will be completed in 1965. There is no information on any follow-on program for Komsomol'sk. If Soviet naval planners consider that 12 E-class submarines (5 E-I and 7 E-II) are adequate for the Pacific Fleet, then the program may be terminated in 1965.



USSR: E-I-CLASS NUCLEAR GUIDED-MISSILE SUBMARINE (SSGN)

At the end of 1965, there will be 9 to 11 E-class submarines in the Northern Fleet. The pattern of deployment of cruise-missile submarines seems to indicate that the Soviet authorities consider the

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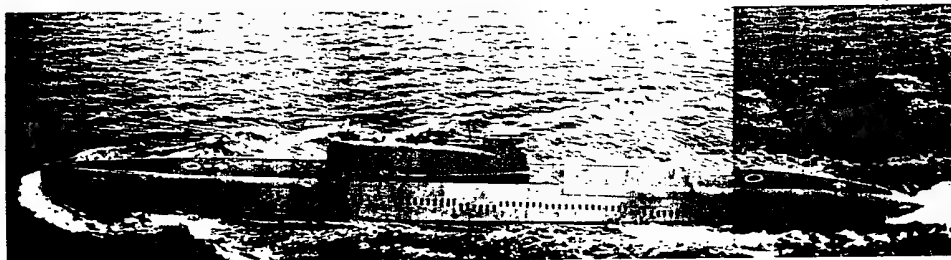
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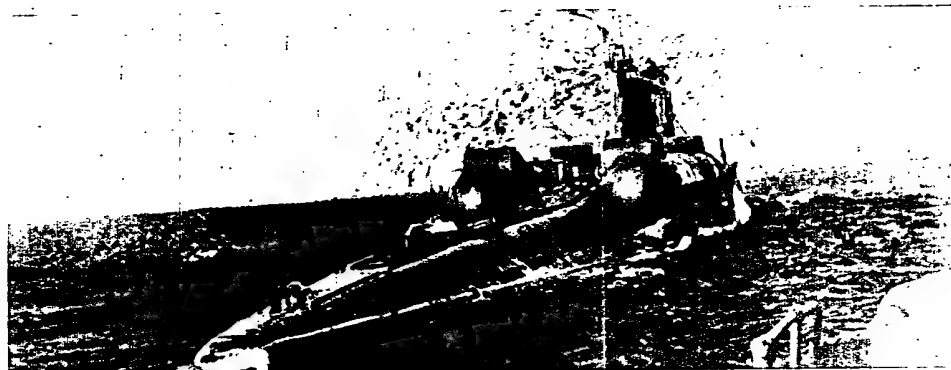
requirement to be greater in the Northern than in the Pacific Fleet, so it is believed that the construction of E-class submarines will be continued for several years at Severodvinsk (see Tables 2 and 3\*).

The construction of the J-class diesel-powered cruise-missile submarine is believed to have been authorized somewhat later than the E-II program. Construction was started in the Baltic Shipyard in Leningrad and in the Krasnoye Sormovo Shipyard in Gor'kiy in 1961. Neither of these shipyards had produced submarines since the termination of the W-class submarine program in 1957. The construction rate for these shipyards is two per year at the Baltic Shipyard and three to four per year at Gor'kiy. Construction at both shipyards probably will continue for several years.



USSR: J-CLASS GUIDED-MISSILE SUBMARINE (SSG)

It is believed that the earlier program for the conversion of the W-class submarines to Twin Cylinder and Long Bin types (SSG) to carry cruise missiles has ended.



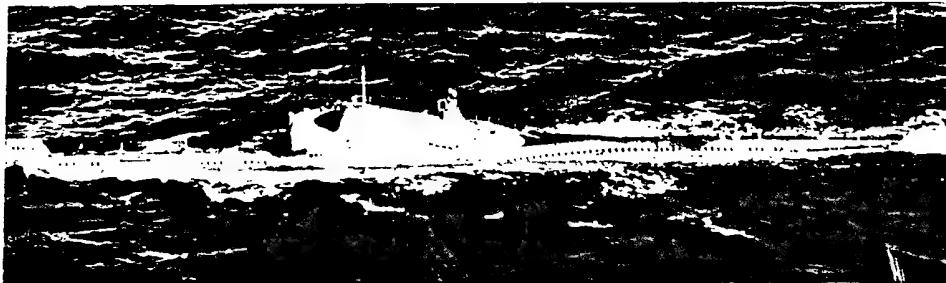
USSR: TWIN CYLINDER (W-CLASS CONVERSION) GUIDED-MISSILE SUBMARINE (SSG)

\* Pp. 31 and 32, respectively, below.

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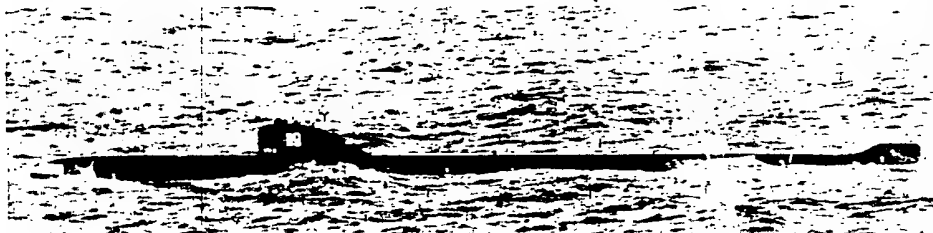


USSR: LONG BIN (W-CLASS CONVERSION) GUIDED-MISSILE SUBMARINE (SSG)

#### D. Production of Nuclear-Powered Submarines

Production of nuclear-powered submarines has held rather steady at eight units per year since 1959. Only two shipyards, Severodvinsk and Komsomol'sk, have been engaged in construction of nuclear-powered submarines, and there is no evidence at this time that more shipyards will be engaged. The average annual rate of construction since 1959 has been six units from Severodvinsk and two units from Komsomol'sk.

Only two programs are known to be under way at the present time. These are the N class of torpedo-attack submarine and the E-II class of cruise-missile submarine. Both of these classes are known to be under construction at the Severodvinsk Shipyard, but only the E class is known to be under construction at Komsomol'sk.



USSR: N-CLASS NUCLEAR TORPEDO-ATTACK SUBMARINE (SSN)

It is doubtful that Soviet leaders hold the view that the annual production rate of nuclear-powered submarines, particularly those of the torpedo-attack type, should be reduced. Fluctuation in output may occur because of the changeover from the construction of one type to another.

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but over the next few years it is believed the current rate generally will be maintained.

If the construction of E-class submarines terminates this year at Komsomol'sk, the most likely program to follow would seem to be the N class or a successor. At present there is only one unit of the N class in the Pacific Fleet, and this unit was transferred from the Northern Fleet in 1963. Had the Soviet authorities planned to further bolster the Pacific Fleet without the construction of N-class units at Komsomol'sk, additional units probably would have been transferred. In addition, it is doubtful that a new class of ballistic-missile submarine would be programed initially at Komsomol'sk; such a submarine would be much more likely to be programed for Severodvinsk, because of its proximity to the Northern Fleet Missile Test Ranges and to principal design and production centers dealing with both the submarine and the missile (see III, below). For the construction of nuclear-powered submarines through 1964 and the projection of probable rates through 1967, see Table 3.

E. Allocation of Resources for Missile-Submarine Construction in the USSR

Although there is no direct evidence of the imposition of a fixed budgetary ceiling on total Soviet naval procurement, estimates of the value -- in dollar equivalents -- of this procurement since 1959 show a relatively level outlay of about \$1.4 billion annually. Moreover, the expenditure pattern implied from these estimates reflects relatively stable proportions: about 50 percent of the total is devoted to nuclear submarines of all types, about 20 percent to conventional submarines, and the remaining 30 percent to surface ships. There was no significant change in this pattern when construction programs were shifted from ballistic-missile submarines to cruise-missile submarines.

This shift in emphasis during 1959-65 is reflected in Table 1, which summarizes expenditures and percentage distribution trends with respect to the various classes of missile submarines. More than half of these expenditures still were going for ballistic-missile submarines as late as 1961, reflecting the trailing edge of the G- and H-class programs. By 1963, cruise-missile submarines of the E-II and J classes almost completely dominated these expenditure categories. Developments and trends for the period 1965 and beyond are uncertain. There is little evidence, however, that industrial or technological capabilities, or material resources as such, would prevent some increase in the current rate of production of nuclear submarines.

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Table 1

USSR: Estimated Distribution of Expenditures  
for Missile-Submarine Construction  
1959-65.

Class	1959	1960	1961	1962	1963	1964 a/	1965 a/
H (nuclear)							
Million US \$	230	210	130	50	30		
Percent of total	36	26	19	8	5		
G (diesel)							
Million US \$	240	280	220	70			
Percent of total	37	34	33	11			
E-I (nuclear)							
Million US \$	120	140	80	30			
Percent of total	18	17	12	5			
E-II (nuclear)							
Million US \$		100	200	360	360	360	260
Percent of total		12	30	57	59	62	47
J (diesel)							
Million US \$				110	220	210	210
Percent of total				17	36	36	38
W conversion							
Million US \$	60	90	40	10			
Percent of total	9	11	6	2			
New class (nuclear) (ballistic) b/							
Million US \$						10	80
Percent of total						2	15
Total							
Million US \$	650	820	670	630	610	580	550
Percent	100	100	100	100	100	100	100

a. Based on the projections shown in Tables 3 and 4, pp. 32 and 34, respectively, below.

b. Based on the assumption that a new class of submarine is currently under construction and that the first unit will be completed in 1967-68, with expenditures allocated accordingly.

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It would seem quite apparent that Soviet naval planners view a mix of diesel and nuclear submarines as desirable in order to achieve the best force for executing the naval missions. It would also appear that this mix will be used for some time in the future.

Although there appears to be an overall limitation on the amount of funds allocated to the Navy for the procurement of ships, there seems to be some room for an increase in funds for nuclear submarines if the planners so elect. This increase most likely would be at the expense of diesel submarines, for it is doubtful that any substantial reduction would be made in funds for surface ship procurement. As experience is gained in the construction of nuclear submarines, production costs undoubtedly will be lowered; however, any increase in numbers as a result would be minor.

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## II. Evolutions in the Naval Strike Mission

Thus it is concluded that there is no direct evidence of a construction program for a new class of ballistic-missile submarines which has reached the launching/delivery stage and that no new submarines of this type have been completed since the last H-class unit in 1963. However, the limitations of currently available sources of information -- primarily photography -- make it unlikely that a new program would be detected prior to the launching of the lead unit, by which time the program would be relatively well along. In the absence of direct evidence, virtually the only early indications of the likelihood and possible timing of future programs are those contained in Soviet public statements and writings concerning the mission and requirements of the Navy. Although such indirect evidence is tenuous and inexplicit at best, it has provided valuable indications over the years of shifts in emphasis for future naval construction programs. In some cases, classified Soviet statements have also been available. The following section reviews in some detail the historical relationship of such evidence to the subsequent course of these programs and presents the information now available that appears to have a bearing on future ballistic-missile submarine programs.

The Soviet Navy has had the responsibility since 1955 for conducting strategic strikes against land targets in enemy territory, although the scope of this mission has varied considerably over the past decade. Initially, the mission included strikes against economic, administrative, and military targets in both coastal areas and inland. This mission was narrowed in 1959 to targets in coastal areas, primarily naval bases, ports, and support facilities. Soviet statements indicate that it may have been expanded again in early 1963 to its original scope through the reassignment to the Navy of targets deep in enemy territory. There is some uncertainty, however, about the views of the new Soviet political and military leadership on this expansion since the fall of Khrushchev in late 1964, and there may even be continuing controversy on this subject which has not yet been resolved within the Soviet hierarchy.

Although not reflected in the order of battle until some years after the event, the changes of responsibility in 1955 and 1959 led to major changes in the production of naval weapons systems. The 1963 change, if it did in fact occur and was sustained, may result in deployment of a new strategic weapons system as early as the last half of 1967.

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A. Early 1955 to Early 1959

Shortly after the change in the Soviet government leadership in 1955, there occurred a major change in naval policy. Of the 11 principal naval shipbuilding programs underway in 1954-55, all but one were very shortly phased out and replaced by new programs such as the Z-V, G, and H classes of ballistic-missile submarines, the E-I and modified W classes of cruise-missile submarines, the Kildin and Krupnyy classes of cruise-missile destroyers, and the Osa and Komar classes of cruise-missile patrol boats.

The new naval programs were in part a response to a broadening of the Navy's missions to include the destruction of land targets not strictly associated with support of an enemy navy. Beginning in 1955, high Soviet officials wrote approvingly of naval missiles that could destroy enemy ships or targets ashore. Khrushchev, for example, stated in April 1956 that guided-missile submarines were the most suitable naval weapons and that they would receive emphasis in the future development of the Soviet Navy. The advantage of this weapon, Khrushchev asserted, was that it would offer the USSR the capability to make "defensive" attacks on the US.

The early statements were rather vague about the types of shore targets to be destroyed. In early 1957, however, industrial and administrative centers in the interior of an enemy country were identified as suitable targets for naval missiles. Putting together such statements with the more recent evidence of corresponding changes in ship construction, the conclusion seems justified that the Soviet Navy was assigned a strategic strike mission in 1955.

Concurrently with the gaining of this mission came the development of new missile systems. Among the new weapons was the SS-N-3 cruise missile, which was developed primarily for use against ships at sea but which also could be employed against coastal targets. Statements by Soviet naval officers, however, indicate that, at least in this early period, ballistic missiles were favored for strikes against targets ashore. Accordingly, therefore, work on three or more ballistic missiles was undertaken during 1955-59. One of the new ballistic missiles, probably a variant of the 150-nm-range SCUD, was first flight-tested in early 1956 and probably became operational aboard Z-V-class submarines in early 1958. A second missile, the 350-nm-range SS-N-4, probably was being designed in 1956 but did not enter into a flight-testing stage until mid-1959. A third missile evidently had been conceived by 1957. An article in Sovetskiy flot of 4 December 1957 stated, "With submarines, missiles

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could be used from both underwater and surface positions, with ranges of more than 1,200 kilometers." The only known naval missile with an operational range of 1,200 kilometers (km) (648 nm) is the SS-N-5, which did not enter the flight-test phase until 1961.

In brief, the period from early 1955 to early 1959 saw the establishment for the Navy of a mission to destroy enemy industrial and administrative centers. At the same time, weapons systems were being developed that were intended to carry out that mission.

B. Early 1959 to Early 1963

At a time when the Soviet Navy was acquiring increasingly effective weapons, its strategic strike mission apparently was restricted. In mid-1959, flight tests of the SS-N-4 commenced, and detail design of the SS-N-5 probably was undertaken. However, a classified article by Admiral Platonov published in May 1961 indicated that the mission had been changed: "Not long ago our submarines armed with ballistic missiles participated in strikes by missile troops of strategic designation against deep enemy objectives. Now, with the appearance in our armament of intercontinental ballistic missiles which can reach any point on earth, missile submarines have been freed from this responsibility. It seems to us that such a step is premature." Classified writings by other high-ranking admirals expressed the same general thoughts.

Study of unclassified statements provides further evidence that a change of orientation had taken place. The Soviet publication Military Strategy, which was edited by Marshal Sokolovskiy and went to press 24 May 1962, devoted only a few pages to the Navy, seeing that service as engaged chiefly in countering an enemy navy. Elsewhere in this publication it was stated: "Development of long-range means of armed combat, particularly the appearance of strategic rocket troops, has created a radically new type of strategic operation -- the nuclear missile against targets throughout the enemy territory. Now, the main role will belong to the Strategic Rocket Troops, and, partly, to the Long-Range Aviation, employing nuclear weapons if this should be necessary." Evidently the Navy was no longer to play a "main role."

The freeing of the Navy from the responsibility for attacking "deep enemy objectives" probably occurred in 1959, well over a year before Admiral Platonov's article. It may well have been one of a series of decisions, including the establishment of the Strategic Rocket Troops and other organizational changes in the armed forces, that were

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announced publicly by Khrushchev in January 1960. Evidence concerning the subsequent course of the missile submarine construction program tends to support a 1959 decision date. For example, the phasing out of the H-class ballistic-missile submarine program at Severodvinsk, which terminated in 1963, was accompanied by the initiation at that yard of the E-II-class cruise-missile submarine program which ultimately replaced the H-class program. It is believed, however, as indicated above (p. 12), that the Severodvinsk yard was in the initial stages of the E-II program as early as the first part of 1960. Similarly, the G-class ballistic-missile submarine program was replaced at Severodvinsk by the F-class (SS) torpedo-attack submarine program, while shortly after 1959 the J-class cruise-missile submarine program was initiated at two other yards, with the first units being completed in 1963. This clear shift in emphasis from ballistic-missile to cruise-missile submarine construction and the timing of the program changes strongly suggest that the basic decision to restrict the Navy's strategic mission was made during 1959.

Although the original mission was reduced, development of naval ballistic missiles was continued. Flight-testing of the newly developed SS-N-4 commenced at Kapustin Yar in June 1959 and in the Northern Fleet area by early December of the same year. An operational capability with the weapon was achieved in late 1960, and it is estimated that by mid-1963 the SS-N-4 had been deployed aboard all 7 Z-V-class submarines and 27 of the 28 G-class submarines but probably no more than 8 of the 10 H-class submarines.

Development also continued on the 650-nm-range SS-N-5. Detail design and fabrication are estimated to have commenced in 1959. Flight tests are believed to have commenced in the Northern Fleet area in the last half of 1961 and, after the launching of approximately 35 missiles from a modified G-class submarine, to have been completed in early 1963.

As with other naval ballistic missiles, the role assigned to the SS-N-5 apparently had changed. Whereas the 4 December 1957 issue of Sovetskiy flot had hinted broadly that a new naval missile with a range of 1,200 km (648 nm) would be used against targets situated "both along the coast and in the interior of enemy territory," by July 1961 Soviet officers were arguing that, in order to avoid antisubmarine defenses, their submarines would have to fire from 500 to 600 nm offshore. The July 1961 statement implies that the SS-N-5 might be suitable for attacks against well-defended coastal targets, but it also implies that the SS-N-4 has limited tactical value. On the other hand, the argument may have been

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a subterfuge to assure development of the SS-N-5 against a possible resumption of a broader mission.

C. Early 1963 to the Present

The role of the Soviet Navy probably was revised in early 1963 to broaden the strike mission of its missile submarine force and to include greater out-of-area operations of the naval forces. This revision may have been linked to a number of changes in national policies.

After the Cuban crisis of October 1962 a particularly intense debate was waged among the Soviet leadership until about May 1963. In part the debate concerned organization and control of national economic planning organizations, the general allocation of resources, and probably a review of specific military programs.

An indication that the Navy's responsibilities were expanded during this time was given by the Navy's Commander-in-Chief. Earlier statements by this officer generally had been careful and restrained, but after the Cuban crisis they took on a stronger tone. In an article published on 24 June 1963 he wrote, "The Caribbean crisis made seamen more deeply aware of the requirements ... on maintaining ... a state of combat readiness which would make it possible to deliver a crushing retaliatory strike against the imperialist aggressor within the shortest possible time ... ." In the same article he also stated, "In the past our ships and naval aviation have operated primarily in offshore areas ... . Now ... we must be prepared through broad offensive operations to deliver crushing strikes against sea and ground targets of the imperialists on any point of the world ocean and adjacent territories." In an article published in the July 1963 issue of Morskoy sbornik, Admiral Gorshkov, in a reference to Soviet atomic submarines, wrote, "These powerful ships are prepared to execute missions peculiar to them in combating the enemy, not only by destroying ships and vessels in any area of the ocean, but also by destroying the most important land objectives deep in enemy territory." A few paragraphs later he stated, "Now, our Navy, an integral component of the Armed Forces, is powerful as never before. It is intended to conduct chiefly offensive operations at great distances from its own shores and close to the shores of any aggressor, in which-ever naval theatre it might be."

A review of the revised 1963 edition of Military Strategy (released to the press on 30 August 1963) also suggests a change of policy. A discussion of strategic operations reads in part, "Now, the main role

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will belong to the Strategic Rocket Troops, Long-Range Aviation, and the missile-carrying submarines employing nuclear weapons if this should be necessary." The reference to submarines was not included in the 1962 edition.

Other authors also have suggested that the Navy's role increased. For example, Marshal of the USSR V. D. Sokolovskiy and Major General Cherednichenko, coauthors of an article published in Krasnaya zvezda in August 1964 ("The Art of War in the New Stage"), state, "The retaliatory strike will be the primary content of the initial phase of a world thermonuclear war. Strategic Rocket Troops as well as rocket-carrying atomic submarines and Long-Range Aviation will obviously be the primary means of delivering a retaliatory nuclear strike. . . . The operations of all these forces and means must be conducted according to a single plan and under unified strategic leadership."

Taken together these statements give strong support to the belief that the naval strategic strike mission had been considerably broadened to again include strikes against targets deep in enemy territory. In addition, they further emphasize the role of nuclear submarines for executing this mission against the most important land objectives deep in enemy territory. Although it is not yet possible to relate these statements to specific changes in submarine construction programs, they probably are related to the increased activity and capability of the existing force. For example, it is of interest that in 1964 and 1965 Soviet naval out-of-area operations increased considerably above earlier levels. The Navy's new aggressiveness was in part a consequence of the growth of technical and operational capability built up over many years but may also be a reflection of policy decisions made in 1963.

Statements by Soviet officials subsequent to the major political and military change in late 1964 could be construed to indicate some dampening of support for this expanded role of the Navy and may in fact reflect continued controversy on the subject. Premier Khrushchev fell from power on 14 October and Marshal Biryuzov, Chief of the General Staff, died in an airplane crash on 19 October. The impact of these and other changes in the Soviet leadership on the Navy's strategic strike mission is uncertain, but statements by high officials about naval matters since late 1964 seem to reflect a weaker support for the broadened strike mission. Minister of Defense Malinovskiy said on 22 February 1965, "Last year was also a step forward in developing the Navy; now its foundation consists of atomic-powered submarines, armed with ballistic and homing rockets capable of hitting ground targets and destroying

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surface ships and submarines of the enemy in any region of the world's oceans." In another article published in February 1965, Admiral Gorshkov wrote, "The Navy has the forces and the means not only for defending its coastline, disrupting an enemy attack from the sea, and neutralizing its striking forces, but also for dealing crushing blows at the enemy fleet and his bases in remote areas of the ocean." The tone of both statements is reminiscent of the 1962 edition of Military Strategy and raises some doubt that the Navy has the same support for the expanded strike mission as that indicated during the period from early 1963 to late 1964.

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III. Probable Developments in Ballistic-Missile Submarine Systems  
During the Next Decade

The weapons most likely to be used by the Soviet Navy in the near future for conducting strikes deep in enemy territory will be H-class nuclear submarines equipped with the SS-N-5 missile. The initial operational capability (IOC) of the SS-N-5 probably was achieved in late 1963. Since that time, only about 13 firings of the missile have been identified. Although several of these firings were conducted from a G-class testbed, the remainder are believed to have been operational training firings from two or three H-class submarines. Although the pattern of deployment of the SS-N-5 is not yet clear, a review of available information suggests that H-class units will be converted from SS-N-4 to SS-N-5 capability but that G- and Z-V-class units most likely will not. The statement by Admiral Gorshkov (p. 23, above)\* in July 1963 suggests that long-range missiles will be deployed aboard only nuclear submarines.

There is no information which clearly shows that a new class of Soviet ballistic-missile submarine is being constructed to carry SS-N-5 missiles. If construction of such a class had been planned it should have appeared before 1965, for the characteristics of the missile undoubtedly were sufficiently known to Soviet designers by early 1960. It would therefore appear that deployment of this missile will be limited to existing H-class submarines.

If it is assumed that the decision in mid-1963 led to the start of production of a new submarine and the development of a new missile system and that these programs continue to have the support of the Soviet leadership, an IOC for this system probably could be achieved by late 1967 or early 1968. This IOC date is based on the employment of 1963 technology. On the other hand, in view of the uncertainty about governmental support for the expanded naval strategic strike mission, it is possible that no new program is under way. Soviet recognition of the high military potential of nuclear-powered missile submarines operating in a retaliatory strike role, however, suggests that development of new systems will eventually be undertaken. If such a program is undertaken\*\* in the next year or two, the first units of such a new system could be operational by the early 1970's.

\* At the time of this statement the SS-N-5 missile system was the longest range missile available to the Navy.

\*\* For a statement by Marshal Sokolovskiy, see p. 24, above.

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Some characteristics of a future ballistic-missile system can be anticipated with a fair degree of confidence, and some milestones can be estimated also. The missile's propellant could be liquid, but, because of the evident Soviet interest in solid-propellant technology for strategic missiles and also because a solid propellant would be safer and simpler to use, its use seems more likely. The range of the missile probably would be between 1,000 and 2,000 nm. Such a range would seem sufficient, for it would provide the added security of operating from greater distances at sea and yet have the range to hit most important inland targets. Two propulsion stages probably would be employed to achieve such ranges. Flight-testing of the missile might start as early as mid-1966, and, as in the case of earlier naval ballistic missiles, critical components might have been proven in older land-based missiles.

The primary launching platform for a new Soviet naval ballistic missile probably would be a nuclear submarine of a new design. An article in the February 1964 issue of *Morskoy sbornik* suggests that a new Soviet ballistic-missile submarine would carry a significantly greater number of missiles than are carried by existing units. Construction by students at the Dzerzhinskiy Naval Academy of a model submarine with eight ballistic-missile tubes also may reflect a desire for more missiles per submarine.\*

Currently there is no reliable evidence of Soviet work on a new naval solid-fueled ballistic missile or a new nuclear submarine. It should be noted that, if a program was initiated in 1963, the first firm evidence probably would not be available until 1966, or when about 75 percent of the development cycle had been completed. The growing evidence, however, of a sizable solid-propellant program in the USSR and the recent display in the May parade would seem to indicate that strategic solid-fueled missiles are part of the Soviet missile program and may be available to the Navy during the next several years.

\* This model was observed for the first time in February 1964 at the Naval Museum in Leningrad.

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APPENDIX

STATISTICAL TABLES

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Table 2

USSR: Estimated Construction of Ballistic-Missile Submarines a/  
1956-63.

	1956	1957	1958	1959	1960	1961	1962	1963
	Annual							
Shipyard and class								
Severodvinsk								
H class				1	4	3	1	1
G class			2	4	6	6	3	
Z-V class		3	2					
Unknown shipyard								
Z-V class	1 b/							
Komsomol'sk								
G class			1	2	1	2	1	
Vladivostok								
Z-V class			1 b/					
	Cumulative							
Class and launchers								
H class				1	5	8	9	10
Launchers				3	15	24	27	30
G class			3	9	16	24	28	28
Launchers			9	27	48	71	83	83
Z-V class	1	4	7	7	7	7	7	7
Launchers	2	8	14	14	14	14	14	14
Total submarines	1	4	10	17	28	39	44	45
Total launchers	2	8	23	44	77	109	124	127

a. No distinction is made in this table between the Type I (SS-N-4 missile-configured) and the Type II (SS-N-5 missile-configured) submarines of the G and H classes. Only one known G-class and probably three to five H-class submarines are yet configured to carry the SS-N-5 missile. This table shows the maximum number of H-class submarines and the minimum number of G-class submarines. It is possible that only 8 of the H class were built but as many as 31 of the G class or G variants. Included in the G-class variants is the testbed (former pendant No. 777), equipped with two launchers, for testing the SS-N-5 ballistic missile and a single submarine possibly specially configured to carry as many as six missiles in the sail.

b. A Z-class torpedo-attack type that has been converted to a Z-V-class ballistic-missile submarine. The Z-V class is included to show the full complement of ballistic-missile submarines in the Soviet fleets. Two Z-V-class submarines, one completed in the Northern Fleet area in 1956 and one completed in 1958 at Vladivostok, probably were conversions of Z-class submarines, whereas the five completed at Severodvinsk in 1957 and 1958 probably were started as Z class but were modified during construction to missile-carrying submarines.

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Table 3

USSR: Estimated Conversion and Construction of Cruise-Missile Submarines a/  
1960-67

	1960	1961	1962	1963	1964	1965	1966	1967	Remarks
	Annual								
Class and shipyard									
Twin Cylinder (W-class conversion)									Operational range, northeast North Atlantic and northwest Pacific; two launchers each; missile 300-nm range. The program has ended.
Unknown shipyard	2	3							
Long Fin (W-class conversion)									Operational range, northeast North Atlantic and northwest Pacific; four launchers each; missile 300-nm range. The program probably has ended.
Paltic Shipyard (Leningrad)			4	2	1				
E-I class (new nuclear-powered)									Operational range, unlimited; six launchers each; missile 300-nm range. Project No. 658, which may be that of the E class. The program has ended.
Komsomolsk Shipyard	2	2	1						
Red class (new nuclear-powered)									Operational range, unlimited; eight launchers each; missile 300/450-nm range. Project No. 675.
Komsomolsk Shipyard			1	1	3	2			This program probably will terminate in 1965 with the delivery of the last hull in a program of seven ships; shipyard hull No. 1771-1777. There is no information on the construction of additional submarines.
Severodvinsk Shipyard		1 to 2	2 to 3	3	3	3	3	3 to 2	Red-class submarines at the fitting-out quay, indicating a continuation of this program. It probably will go on at Severodvinsk at least through 1967 for Northern Fleet requirements for Red-class submarines and will be at least to equal and probably to exceed those for the Pacific Fleet.
J class (new diesel-powered)									Operational range, US coast; four launchers each; missile 300/450-nm range. There is no information on the planned production program at either of these shipyards. It is believed that the program will continue at least through 1967.
Paltic Shipyard (Leningrad)				2	2	2	2	2	
Eranga Gornye Shipyard (Murmansk)				3 to 4	3 to 4	3 to 4	3 to 4	3 to 4	

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	1960	1961	1962	1963	1964	1965	1966	1967	Remarks
Cumulative									
Class and launchers b/									
Twin Cylinder (W-class conversion)	2	5	5	5	5	5	5	5	25X1
Launchers	4	10	10	10	10	10	10	10	
Long Bin (W-class conversion)		4	6	7	7	7	7	7	
Launchers		16	24	28	28	28	28	28	
F-I class	2	4	5	5	5	5	5	5	
Launchers	12	24	30	30	30	30	30	30	
F-II class			2 to 3	5 to 7	11 to 13	16 to 18	19 to 21	22 to 23	
Launchers			16 to 24	40 to 56	88 to 104	128 to 144	152 to 168	176 to 184	
J class				5 to 6	10 to 12	15 to 18	20 to 24	25 to 30	
Launchers				20 to 24	40 to 48	60 to 72	80 to 96	100 to 120	
Total submarines	4	13	18 to 19	27 to 30	38 to 42	48 to 53	56 to 62	64 to 70	
Total launchers	16	20	80 to 88	128 to 148	196 to 220	256 to 284	300 to 332	344 to 372	

a. Excluding one W-class submarine converted to carry a single cylinder. This submarine was first observed in 1961, but it is believed to be only an experimental model and is believed to have preceded the development of the twin-cylinder model that was observed first in 1960.

b. All submarines are considered to be capable of firing the SS-N-3A 300-nm-range missile, and all submarines of the F-II and J classes are also capable of firing the longer range SS-N-3B 450-nm-range missile.

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Table 4

USSR: Estimated Construction of Nuclear-Powered Submarines  
1958-67

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
	Annual									
Shipyard and class										
Severodvinsk	<u>1</u>	<u>3</u>	<u>6</u>	<u>6</u>	<u>5 to 6</u>	<u>6 to 7</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
N class	1	2	2	3	3	3	3	3	3	3
H class		1	4	3	1	1				
E-II class					1 to 2	2 to 3	3	3	3	3 to 2
New class (ballistic)										0 to 1
Komsomol'sk			<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>
E-I class			2	2	1					
E-II class					1	1	3	2		
N class									2	2
Total	<u>1</u>	<u>3</u>	<u>8</u>	<u>8</u>	<u>7 to 8</u>	<u>7 to 8</u>	<u>9</u>	<u>8</u>	<u>8</u>	<u>8</u>
	Cumulative									
Class										
N class	1	3	5	8	11	14	17	20	25	30
H class		1	5	8	9	10	10	10	10	10
E-I class			2	4	5	5	5	5	5	5
E-II class					2 to 3	5 to 7	11 to 13	16 to 18	19 to 21	22 to 23
New class (ballistic)										0 to 1
Total	<u>1</u>	<u>4</u>	<u>12</u>	<u>20</u>	<u>27 to 28</u>	<u>34 to 36</u>	<u>43 to 45</u>	<u>51 to 53</u>	<u>59 to 61</u>	<u>67 to 69</u>

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